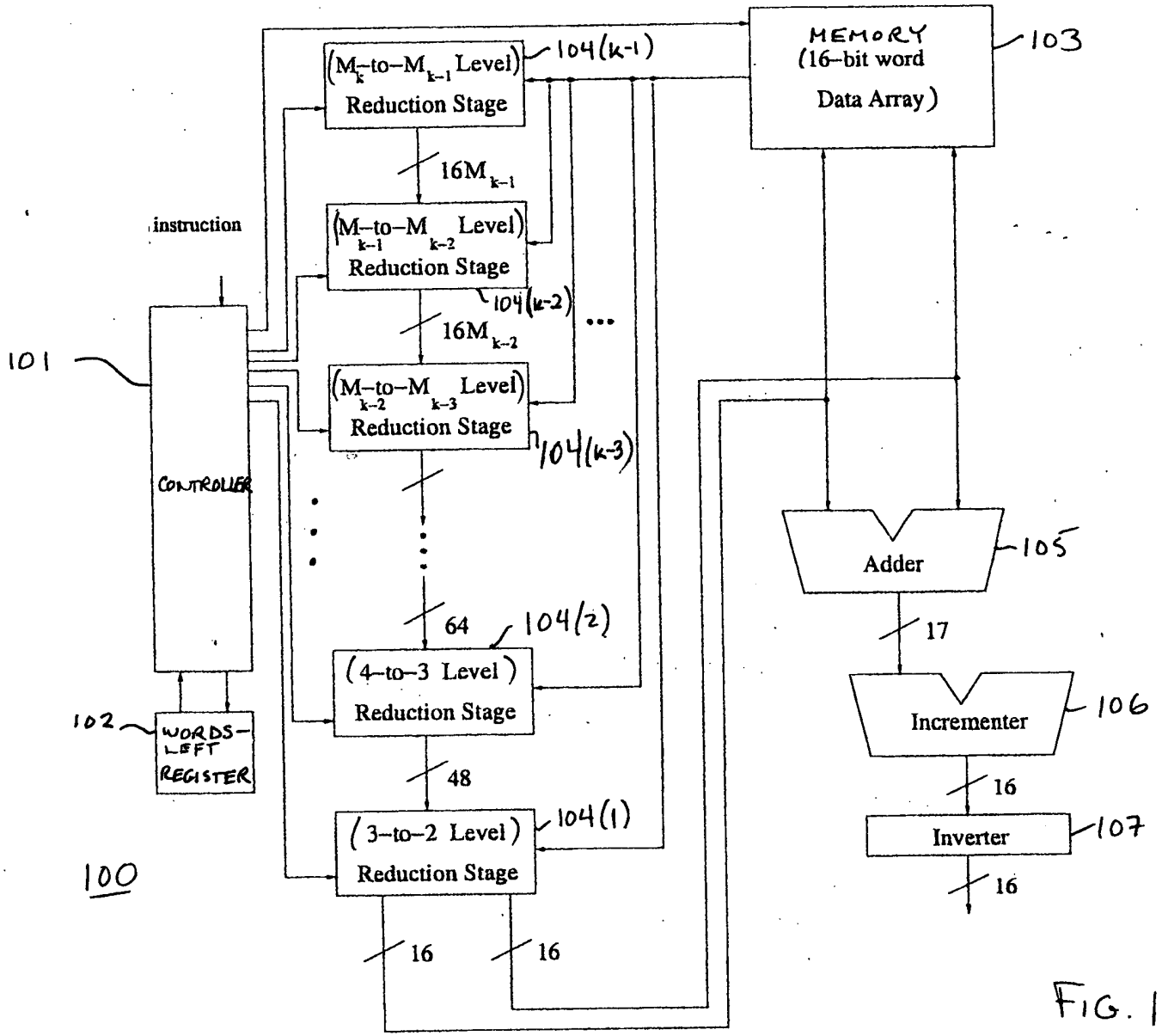
MEMORY
(16-bit word
Data Array)
103
(M_k-to-M_{k-1} Level)
Reduction Stage
104(k-1)
$16M_{k-1}$
(M_{k-1}-to-M_{k-2} Level)
Reduction Stage
104(k-2)
$16M_{k-2}$
(M_{k-2}-to-M_{k-3} Level)
Reduction Stage
104(k-3)
instruction
101
CONTROLLER
64
104(2)
(4-to-3 Level)
Reduction Stage
48
(3-to-2 Level)
Reduction Stage
104(1)
16
16
102
WORDS-LEFT REGISTER
100
Adder
105
17
Incrementer
106
16
Inverter
107
16

FIG. 1

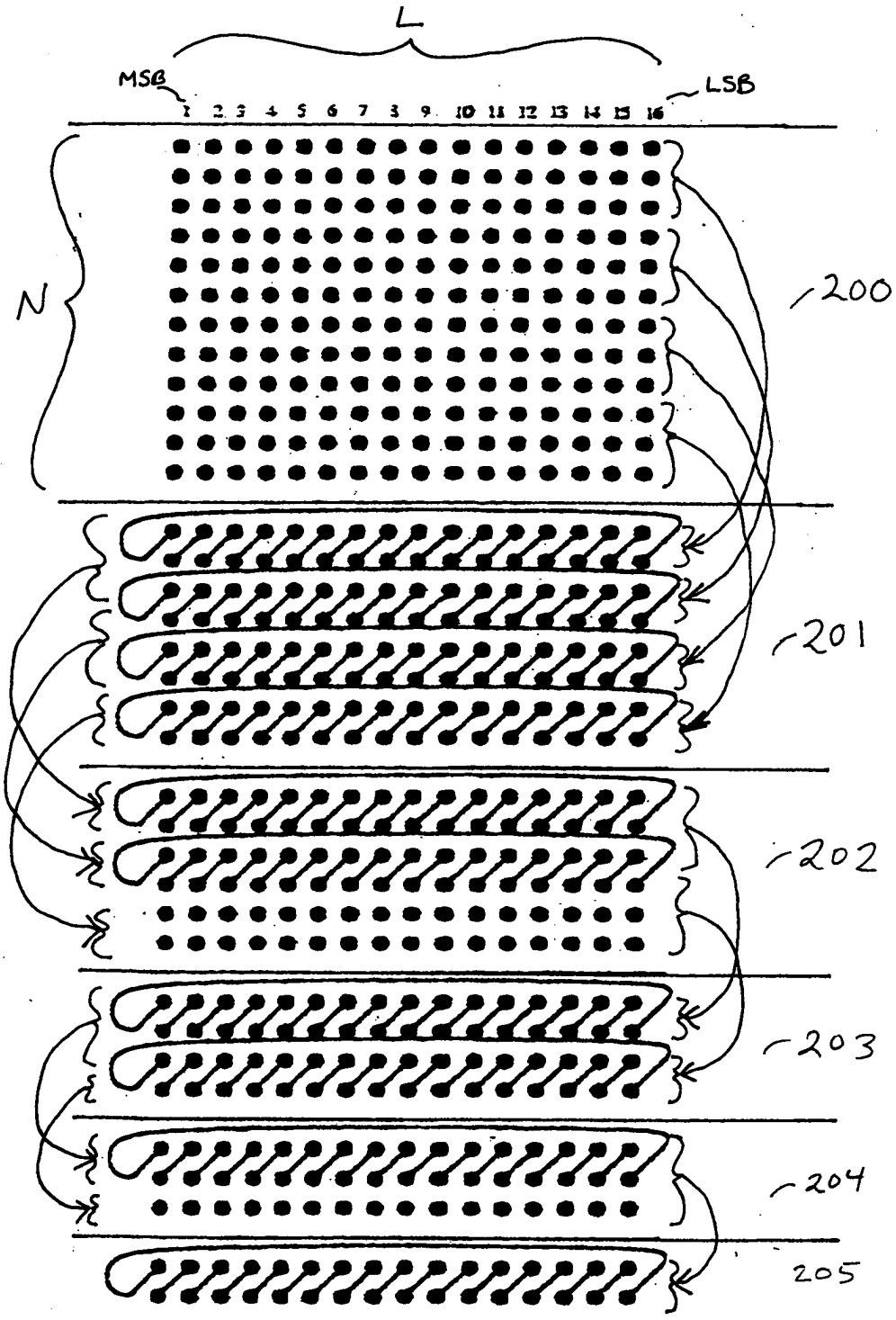

FIG. 2

FIG. 3

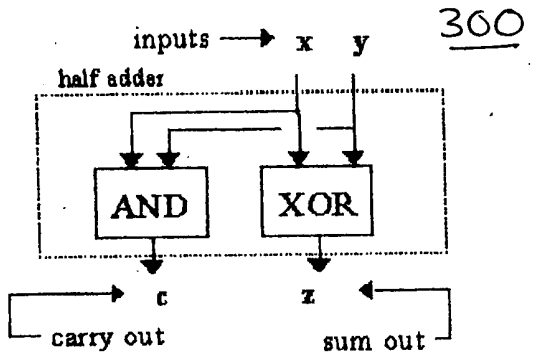

FIG. 5

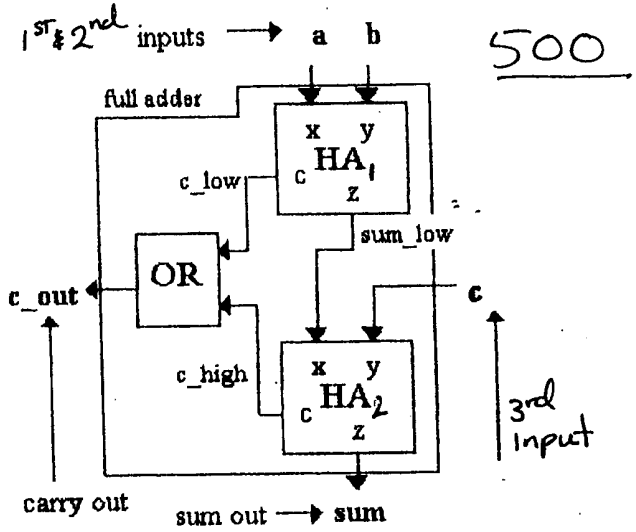

FIG. 4

Inputs	outputs	
x,y	c	z
0,0	0	0
0,1	0	1
1,0	0	1
1,1	1	0

FIG. 6

Inputs	outputs	
c_in,a,b	c_out	sum
0,0,0	0	0
0,0,1	0	1
0,1,0	0	1
0,1,1	1	0
1,0,0	0	1
1,0,1	1	0
1,1,0	1	0
1,1,1	1	1

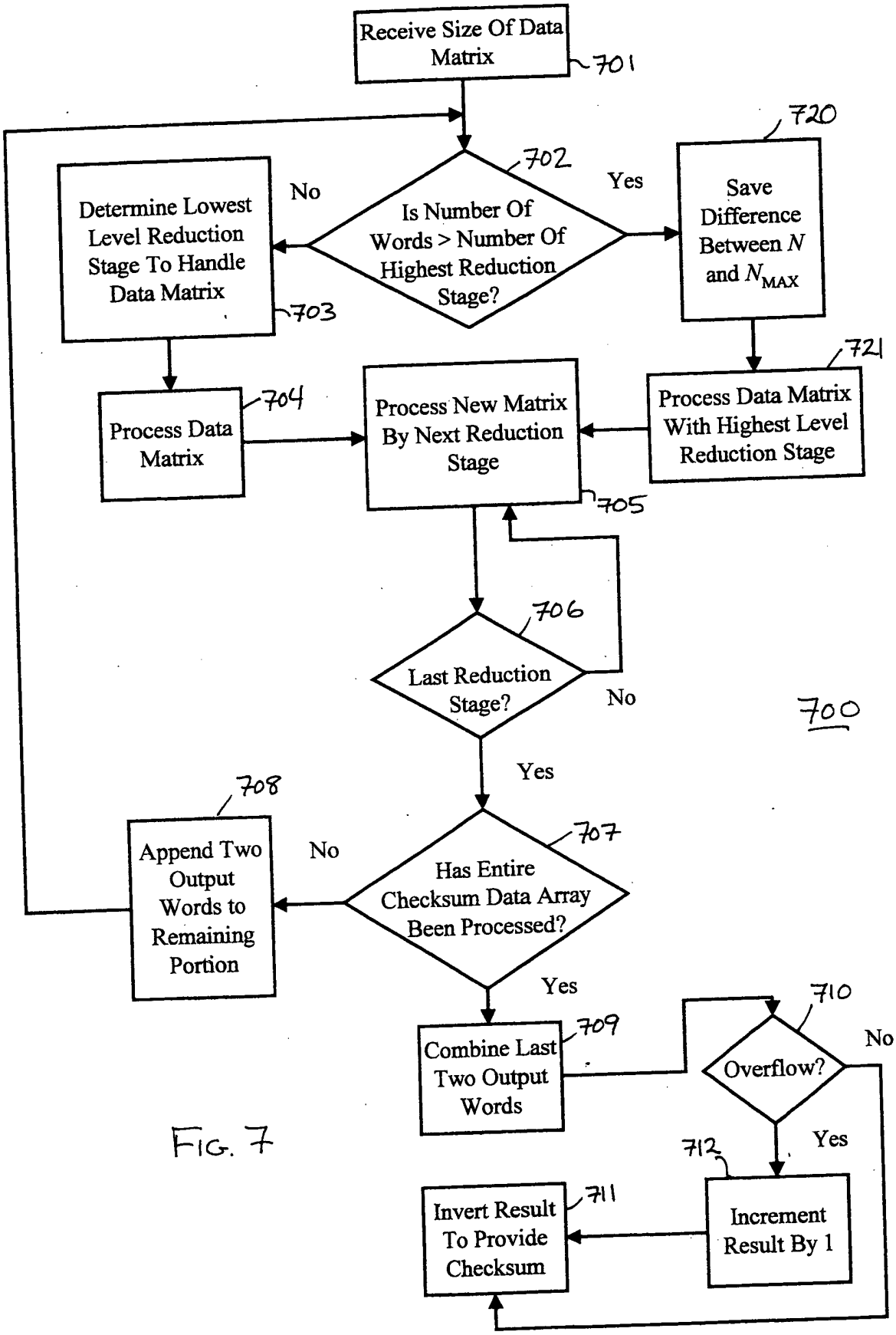
Receive Size Of Data Matrix
701
720
702
Is Number Of Words > Number Of Highest Reduction Stage?
No
Yes
Save Difference Between N and N_{MAX}
Determine Lowest Level Reduction Stage To Handle Data Matrix
703
721
Process Data Matrix
704
Process New Matrix By Next Reduction Stage
Process Data Matrix With Highest Level Reduction Stage
705
706
Last Reduction Stage?
No
700
Yes
708
Append Two Output Words to Remaining Portion
No
707
Has Entire Checksum Data Array Been Processed?
Yes
710
709
Combine Last Two Output Words
Overflow?
No
Yes
712
Invert Result To Provide Checksum
711
Increment Result By 1

FIG. 7